

## **Multiple Hydrocarbon Accumulation Systems and the Pathways for Hydrocarbon Migration in Luliang Uplift, the Junggar Basin, China**

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Luliang area is a big uplift in the center of Junggar basin, China. This tectonic area will be a favorable prospect for a big oil field named Luliang Oilfield was discovered recently. The investigations in the Luliang area showed the characteristics of the multiple hydrocarbon accumulation systems. Three hydrocarbon accumulation subsystems in the area could be divided, namely, the Mahu Sag-East Slope of Circum-Mahu Sag subsystem (the MM subsystem), the Sag West of Well Pen-1 to the Shinan Oilfield subsystem (the PS subsystem) and the Sag West of Well Pen-1 to the Luliang Oilfield subsystem (the PL subsystem).

In the MM subsystem, the source rock was the Fengcheng Formation in the Mahu Depression, with petroleum accumulation times being Late Triassic and late Middle Jurassic. The pathways were mainly unconformities and fan-shaped sand-bodies. In the PS subsystem, the source rock was mainly the Fengcheng Formation in the Sag West of Well Peng-1, with petroleum accumulation times being Early Cretaceous and Late Paleogene. The pathways were mainly faults and unconformities, and the accumulations being ladder-shaped. In the PL subsystem, the source rock was mainly the Wuerhe Formation in the Sag West of Well Peng-1, with petroleum accumulation times being late Middle Jurassic-Early Cretaceous and Late Paleogene. The MM subsystem was comparatively independent, and the PL subsystem was a continuance and further development of the PS one. The characteristics of crude oil in every subsystem were different from each other.

Faults are main passages for long-distance hydrocarbon migration from source rocks to pools in Luliang uplift, and Jidong fault has played a key role in this aspect. The existence of unconformities makes up a prerequisite for hydrocarbon accumulation, and the inhomogeneity of unconformities seems to be an important factor for the differences in hydrocarbon accumulations in this area. The passage systems formed by faults and unconformities are effective pathway networks which are very important for hydrocarbon migration and accumulation. The passage system formed by the unconformity surface of Permian strata and the reverse faults at depth is a key factor for hydrocarbon migration from source rocks to Jurassic strata, and the passage system formed by the unconformity surface at the bottom of Cretaceous strata and the normal faults in Jurassic strata is a necessary element for hydrocarbon migration from Jurassic to Cretaceous strata.